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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/597,471 | 08/07/2008 | Yuko Fukawa | 81872.0121 | 1649 |

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| EXAMINER | |
|---|---|
| AYAD, TAMIR | |
| **ART UNIT** | **PAPER NUMBER** |
| 4133 | |
| **MAIL DATE** | **DELIVERY MODE** |
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/597,471 | FUKAWA ET AL. | |
| | Examiner | Art Unit | |
| | TAMIR AYAD | 4133 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-11* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-11* is/are rejected.

7)☒ Claim(s) *7* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *26 July 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *7/26/2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

## DETAILED ACTION

### *Oath/Declaration*

1. The specification to which the oath or declaration is directed has not been adequately identified. See MPEP § 602.

Appropriate correction is required.

### *Claim Objections*

2. Claim 7 is objected to because of the following informalities: the term convexconcave is not defined in the specification. For the purpose of this Office action, said claim has been treated as if convexconcave is convex and concave parts are provided in said rear surface member. Appropriate correction is required.

### *Claim Rejections - 35 USC § 102*

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-4 are rejected under 35 U.S.C. 102(b) as being anticipated by Shihobi (JP 2002-168062).

Regarding claim 1, Shihobi discloses a solar cell module ([0005]), comprising; a front surface member having translucency (Fig. 2, translucent plate 1, [0020]), a rear surface member ([0022], rear face), an intermediate member

formed of an insulator disposed between said front surface member and said rear surface member (Fig. 4, thermal break 51, [0036]), a first solar cell element group in which a plurality of solar cell elements are electrically connected (Fig. 3, [0035]), disposed between said front surface member and said intermediate member with its light receiving surface facing said front surface member (Fig. 4, [0010], and a second solar cell element group in which a plurality of solar cell elements are electrically connected (Fig. 3, [0035]), disposed between said rear surface member and said intermediate member with its light receiving surface facing said rear surface member (Fig. 4, [0010]).

Regarding claim 2, Shihobi discloses all the claim limitations as set forth above, and further discloses wherein said plurality of solar cell elements are connected in series in both said first solar cell element group and said second solar cell element group ([0023], and both solar cell element groups are electrically insulated through said intermediate member (Fig. 4, item 51, [0027], [0036]).

Regarding claim 3, Shihobi discloses all the claim limitations as set forth above, and further discloses wherein said rear surface member is a material having translucency ([0022]).

Regarding claim 4, Shihobi discloses all the claim limitations as set forth above, and further discloses wherein said intermediate member is a material that reflects light ([0008]).

## *Claim Rejections - 35 USC § 103*

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

7. Claims 5 and 8-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shihobi (JP 2002-168062) in view of Tetsuo et al. (JP 11-31834).

Regarding claim 5, Shihobi discloses all the claim limitations as set forth above.

Shihobi does not explicitly disclose wherein said intermediate member is a material having translucency.

Tetsuo discloses two or more photovoltaic cells in both sides of the middle sheet of glass ([0016]). The sheet of glass has translucency and therefore

Tetsuo discloses wherein said intermediate member is a material having translucency ([0016]).

Shihobi and Tetsuo are combinable because they are concerned with the same field of endeavor, namely solar cells.

It would have been obvious to one of ordinary skill in the art at the time of the invention to replace the reflective intermediate member of Shihobi with the translucent intermediate member of Tetsuo because the replacement is an obvious matter of design choice. Further, as taught by Tetsuo, the manufacturing of a larger size, more efficient solar cell module is facilitated with the design of Tetsuo ([0004], [0005]).

Regarding claim 8, modified Shihobi discloses all the claim limitations as set forth above.

Shihobi does not explicitly disclose wherein a solar cell element comprising said first solar cell element group and a solar cell element comprising said second solar cell element group are disposed symmetrically with said intermediate member as the reference position. However, the solar module depicted by Shihobi appears symmetrical (Fig. 4).

Tetsuo discloses two or more photovoltaic cells on both sides of the middle sheet of glass with fixed spacing ([0016]).

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate a symmetric design as explicitly taught by Tetsuo into the device of Shihobi because Tetsuo discloses the advantages of the design,

specifically the manufacturing of a larger size, more efficient solar cell module ([0004], [0005]).

Regarding claim 9, modified Shihobi discloses all the claim limitations as set forth above.

Shihobi does not explicitly disclose wherein a solar cell element comprising said first solar cell element group and a solar cell element comprising said second solar cell element group are disposed unsymmetrically with said intermediate member as the reference position. However, it would have been obvious to one of ordinary skill in the art at the time of the invention that since Shihobi is silent with regards to whether the groups are symmetric, and since Tetsuo specifies symmetry of the groups ([0016]), that the assumption that the groups of Shihobi are disposed unsymmetrically with said intermediate member as the reference position is valid due to the absence of the specification of symmetry by Shihobi.

8. Claims 6-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shihobi (JP 2002-168062) in view of Masashi et al. (JP 2002-111035).

Regarding claim 6, Shihobi discloses all the claim limitations as set forth above.

Shihobi does not explicitly disclose wherein said rear surface member is a material that reflects light.

Masashi discloses the reflecting plate made to reflect in the rear face of a photovoltaic cell ([0008]). Therefore, Masashi discloses wherein said rear surface member is a material that reflects light.

Shihobi and Masashi are combinable because they are concerned with the same field of endeavor, namely solar cells.

It would have been obvious to one of ordinary skill in the art at the time of the invention to replace the translucent rear surface member of Shihobi with the reflective rear surface member of Masashi because, as taught by Masashi, the incorporation of the reflective rear surface member decreases the number of cells per module, and the overall weight of the module minimized ([0040]).

Regarding claim 7, modified Shihobi discloses all the claim limitations as set forth above.

Shihobi does not explicitly disclose wherein convexconcave is provided in said rear surface member.

Masashi discloses wherein convexconcave is provided in rear surface member ([0036]).

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the convexconcave rear surface member of Masashi in the design of the rear surface member of Shihobi because Masashi teaches that the incidence of all of the light that penetrates the translucent part can be equally distributed over the whole surface with the convexconcave property of the rear surface member ([0036]).

9. Claims 10-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over modified Shihobi (JP 2002-168062) as applied to claims 1-9, in view of Kimura et al. (US 6,448,489).

Regarding claim 10, modified Shihobi discloses all the claim limitations as set forth above.

Modified Shihobi does not explicitly disclose a first solar cell string having connected said first solar cell element group, and a second solar cell string having connected said second solar cell element group, a power conversion means for converting direct-current power to alternating-current power as well as controlling so that direct-current power is output at the maximum power point of these first and second solar cell string, and a voltage adjustment means for adjusting direct-current voltage that is output from said second solar cell string and supplying the voltage between said first solar cell string and said voltage adjustment means, wherein said voltage adjustment means adjusts the output voltage of said second solar cell string so that it coincides with the output voltage of said first solar ceil string.

Kimura discloses a first solar cell string having connected said first solar cell element group and a second solar cell string having connected said second solar cell element group (Fig. 1, abstract, C2/L63-64, C3/L5-7), a power conversion means for converting direct-current power to alternating-current power (Fig. 1, abstract) as well as controlling so that direct-current power is output at the maximum power point of these first and second solar cell string

(Fig. 9, C2/L63-67) and a voltage adjustment means for adjusting direct-current voltage that is output from said second solar cell string and supplying the voltage between said first solar cell string and said voltage adjustment means (C3/L15-21) wherein said voltage adjustment means adjusts the output voltage of said second solar cell string so that it coincides with the output voltage of said first solar ceil string (C3/L15-21).

Shihobi and Kimura are combinable because they are concerned with the same field of endeavor, namely solar cells.

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the connectivity, power conversion, as well as voltage adjustment of Kimura to the device as Shihobi because Kimura discloses that the incorporation of these elements decreases the weight of the system and increases power conversion efficiency (C2/L56-57).

Regarding claim 11, modified Shihobi discloses all the claim limitations as set forth above.

Shihobi does not explicitly disclose wherein said voltage adjustment means adjusts the direct-current voltage that is output from said second solar cell string based on the voltage which is to be the maximum electric power of said second solar cell string to coincide with the output voltage of said first solar cell string.

Kimura discloses wherein said voltage adjustment means adjusts the direct-current voltage that is output from said second solar cell voltage which is to

be the maximum electric power of said second solar cell string to coincide with the output voltage of said first solar cell string (C3/L15-21).

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the connectivity, power conversion, as well as voltage adjustment of Kimura to the device as Shihobi because Kimura discloses that the incorporation of these elements decreases the weight of the system and increases power conversion efficiency (C2/L56-57).

## *Conclusion*

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

a. Suenaga et al. (US 2004/0211459) discloses photovoltaic device comprising a first and second solar cell element group connected respectively to a first and second solar cell string, as well as means for power conversion, voltage adjustment, and power/voltage matching between first and second solar cell strings.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to TAMIR AYAD whose telephone number is 571-270-1188. The examiner can normally be reached on Monday - Thursday, 8:00 AM to 6:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Basia Ridley can be reached on 571-272-1453. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/T. A./
Examiner, Art Unit 4133
5/7/2009

/Barbara L. Gilliam/
Supervisory Patent Examiner, Art Unit 4191